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WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE XXXIV  
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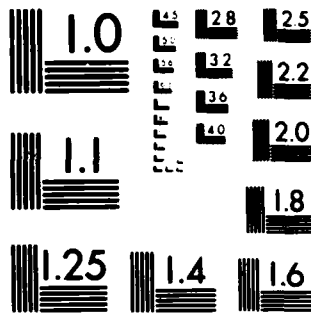
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**WOOD ANATOMY  
OF THE  
NEOTROPICAL SAPOTACEAE  
XXXIV.  
FRANCHETELLA-EREMOLUMA**

RESEARCH PAPER FPL 422

FOREST PRODUCTS LABORATORY  
FOREST SERVICE  
U.S. DEPARTMENT OF AGRICULTURE  
MADISON, WIS.

OCTOBER 1982

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### Abstract

Franchetella was described by Pierre in 1890 and the genus Eremoluma by Baillon in 1891. However, the species attributed to these two genera were soon absorbed into the large and ever-growing Lucuma. In 1942, when Baehni monographed the genus Pouteria, the type species of Franchetella and Eremoluma became synonyms of Pouteria in Section Eremoluma. In 1961 Aubréville reinstated Franchetella and Eremoluma to generic status but admitted they were closely allied; a similar opinion is held by J. M. Pires of Museu Goeldi.

Anatomically, two groups are evident but several species do not appear to belong to this series. Because of the confused taxonomy, which is also reflected in the wood anatomy, a detailed anatomical description has not been prepared at this time. It is hoped that the taxonomy will be clarified in the near future.

### Preface

The Sapotaceae form an important part of the ecosystem in the neotropics; for example, limited inventories made in the Amazon Basin indicate that this family makes up about 25 percent of the standing timber volume there. This would represent an astronomical volume of timber but at present only a very small fraction is being utilized. Obviously, better information would help utilization--especially if that information can result in clear identification of species.

The Sapotaceae represent a well-marked and natural family but the homogeneous nature of their floral characters makes generic identification extremely difficult. This in turn is responsible for the extensive synonymy. Unfortunately, species continue to be named on the basis of flowering or fruiting material alone and this continues to add to the already confused state of affairs.

This paper on Franchetella-Eremoluma is the thirty-fourth in a series describing the anatomy of the secondary xylem of the neotropical Sapotaceae. The earlier papers, all by the same author and under the same general heading, include:

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|--|--|
| I. Bumelia--Res. Pap. FPL 325          | XVIII. Gomphiluma--Res. Pap. FPL 362   |
| II. Mastichodendron--Res. Pap. FPL 326 | XIX. Chromolucuma--Res. Pap. FPL 363   |
| III. Dipholis--Res. Pap. FPL 327       | XX. Manilkara--Res. Pap. FPL 371       |
| IV. Achrouteria--Res. Pap. FPL 328     | XXI. Barylucuma--Res. Pap. FPL 372     |
| V. Calocarpum--Res. Pap. FPL 329       | XXII. Pradosia--Res. Pap. FPL 373      |
| VI. Chloroluma--Res. Pap. FPL 330      | XXIII. Gayella--Res. Pap. FPL 374      |
| VII. Chrysophyllum--Res. Pap. FPL 331  | XXIV. Ecclinusa--Res. Pap. FPL 395     |
| VIII. Diploon--Res. Pap. FPL 349       | XXV. Ragala--Res. Pap. FPL 396         |
| IX. Pseudoxythece--Res. Pap. FPL 350   | XXVI. Myrtiluma--Res. Pap. FPL 397     |
| X. Micropholis--Res. Pap. FPL 351      | XXVII. Sarcaulis--Res. Pap. FPL 398    |
| XI. Priurella--Res. Pap. FPL 352       | XXVIII. Labatia--Res. Pap. FPL 416     |
| XII. Neoxythece--Res. Pap. FPL 353     | XXIX. Eglerodendron--Res. Pap. FPL 417 |
| XIII. Podoluma--Res. Pap. FPL 354      | XXX. Pseudocladia--Res. Pap. FPL 418   |
| XIV. Elaeoluma--Res. Pap. FPL 358      | XXXI. Pouteria--Res. Pap. FPL 419      |
| XV. Sandwithiodoxa--Res. Pap. FPL 359  | XXXII. Richardella--Res. Pap. FPL 420  |
| XVI. Paralabatia--Res. Pap. FPL 360    | XXXIII. Englerella--Res. Pap. FPL 421  |
| XVII. Gambeya--Res. Pap. FPL 361       |  |

Publication in this manner will afford interested anatomists and taxonomists the time to make known their opinions and all such information is hereby solicited. At the termination of this series the data will be assembled into a comprehensive unit.

WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE

XXXIV. FRANCHETELLA-EREMOLUMA

By

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U.S. Department of Agriculture

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Introduction

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The genus Franchetella was established by Pierre in 1890, represented by the type species F. tarapotensis (Eichl.) Pierre that had been discovered in the Peruvian Amazon and originally designated as Lucuma tarapotensis Eichl. The genus Eremoluma was created by Baillon in 1891 based on a collection from French Guiana and designated as E. sagotiana Baill. Subsequent students of the Sapotaceae did not accept these genera and relegated them to synonymy under the dubious genus Lucuma.

In 1942 Baehni (4)<sup>3/</sup> transferred the types of Franchetella and Eremoluma and a number of additional species to Pouteria in Section Eremoluma that included the following species: Pouteria anibifolia (A. C. Smith) Baehni, P. cearensis Baehni, P. rostrata (Huber) Baehni, P. sagotiana (Baill.) Eyma, P. reticulata (Engl.) Eyma, P. meyeri (Standl.) Baehni, P. unilocularis (Donn.-Sm.) Baehni, P. tarapotensis (Eichl.) Baehni, P. platyphylla (A. C. Smith) Baehni, P. campanulata Baehni, and later (5) added P. purusiana Baehni.

In 1961 Aubréville (1) reinstated Eremoluma to generic status, accepting the type species E. sagotiana, and added the new species E. krukoffii and E. williamii. At the same time he also reinstated Franchetella tarapotensis (Eichl.) Pierre as the type species and transferred the Section Eremoluma species, reticulata, gongrijpii, anibifolia, platyphylla, and a new species, pubescens to Franchetella. Later (2) he transferred unilocularis and added two new species (3), atabapoensis, and neblinaensis to Franchetella.

1/ Pioneer Research Unit, Forest Products Laboratory.

2/ Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

3/ Underlined numbers in parentheses refer to literature cited at the end of this report.

At the Goeldi Museu in Belem, campanulata, jariensis, purusiana, rostrata, and virescens are found under Eremoluma and are probably attributable to J. M. Pires. Eremoluma jariensis and virescens have been described by Pires but remain unpublished.

#### Wood Anatomy

Anatomically, the specimens available for this study can be separated into two groups on the basis of the pore arrangements given below. Wood from a type tree is indicated by (T).

##### (A) Pores clustered-echelon

F. crassifolia  
F. gongrijpii  
F. platyphylla (T)  
F. reticulata  
E. sagotiana (T)  
F. tarapotensis  
F. unilocularis

##### (B) Pores diffuse

F. anibifolia (T)  
F. atabapoensis (T)  
E. campanulata (T)  
E. jariensis  
E. krukoffii (T)  
E. purusiana (T)  
E. rostrata  
E. virescens  
E. williamii (T)

It will be noted that all but one of the species in Group A were assigned to Franchetella with the exception of sagotiana which is the generic type of Eremoluma. This group is further unified by intervessel pitting diameters of 3-5  $\mu$ m. Within Group A reticulata and sagotiana are distinguished by their uniseriate wood rays. The identity of our sole specimen of sagotiana represented by Lanjouw & Lindeman 2651 is questionable.

Group B consists primarily of species assigned to Eremoluma with the exception of anibifolia, which Baehni included in Section Eremoluma and made the sole member of his subsection racemiferae, and F. atabapoensis, which Aubréville described from leaves and seeds. The intervessel pit diameter is more variable in Group B: 4-6  $\mu$ m in anibifolia, atabapoensis, campanulata, krukoffii, and purusiana; 6-8  $\mu$ m in virescens; 8-10  $\mu$ m in jariensis, rostrata, and williamii. Within Group B, krukoffii and williamii are characterized by uniseriate wood rays but these two species differ in the size of their intervessel pitting. Eremoluma williamii would be a unique member of this series because of a maximum pore diameter approximately twice that of any other member of this series. However, the identity of williamii is questionable, as is also that of jariensis, rostrata, and perhaps virescens on the basis of the wood specimens available for this study. It is evident that the herbarium vouchers for these particular specimens require careful examination.

A detailed anatomical description was not prepared because of the deviations that may be due to incorrect determinations of the herbarium vouchers. It is hoped that this situation will be corrected before the assembling of the

family data into a single publication. Using the text information, tabular data, and photomicrographs it should be possible to make identifications of wood specimens.

#### General Description of the Wood

Wood light brown without luster. Moderately heavy with an average specific gravity of 0.87; individual specimens range from 0.72 to 1.03. Growth rings usually vague and indistinct. Maximum pore diameter generally less than 110  $\mu$ m but attaining a diameter of 220  $\mu$ m in williamii. Parenchyma banded; pores in diffuse or in clustered-echelon arrangement. Bark smooth and thin, generally less than 4 mm in thickness; finely laminated. The bark of atabapoensis is 6 mm thick and shows a distinctly darker and pronounced inner bark. The outer bark is fissured longitudinally and horizontally producing a cubical pattern. Froth test negative.

#### Notes

1. Lucuma anibifolia A. C. Smith was transferred to Pouteria anibifolia (A. C. Smith) Baehni (4) in which it was placed in Section Eremoluma and became the sole member of the subsection racemiferae. Wood from the type tree, Krukoff 1447, and the seven other Krukoff collections were available for this study and all were cited by Baehni (4). Aubréville (1) made the transfer to Franchetella anibifolia (A. C. Smith) Aubr. in 1961.
2. Franchetella atabapoensis Aubréville (3) was described from leaves and seeds of the only known specimen, Wurdack & Adderley 42746, collected in Amazonas, Venezuela. This specimen differs from the other species by its dark, cubically fissured bark that is thicker than in the other specimens.
3. Eremoluma campanulata (Baehni) Pires was originally described as Pouteria campanulata Baehni and placed in the Section Eremoluma. This species is based on A. C. Smith 2944 collected in Para, Brazil; the original description is based on leaves and flowers. The transfer to Eremoluma does not appear in the literature and presumably is attributable to J. M. Pires of Museu Goeldi. Two other specimens received as E. campanulata, Oliveira 2937 and 3059, are rather different from the type and probably belong to another species in this series.
4. Franchetella crassifolia (Radlk.) Pires & W. Rodr. (7), represented by Prance et al. 14998, appears to be the only extant wood specimen of this species.

5. Franchetella gongrijpii (Eyma) Aubr. (1) was transferred from Pouteria gongrijpii by Eyma (6) who had assigned this species to the Section Pseudocladia. The woods of Pseudocladia are darker colored and appreciably heavier, exceeding a specific gravity of 1.00. Characterized by dark-brown globules associated with silica.
6. Eremoluma jariensis Pires (unpublished?) is apparently allied to the species in this series but distinct because of its large intervessel pitting, 8-10  $\mu$ m.
7. Eremoluma krukoffii Aubr. & Pellegr. (1) was described from leaves and flowers based on the type specimen, Krukoff 8619, collected in Amazonas, Brazil. Anatomically it is closely allied with E. reticulata and E. sagotiana, sharing the distinctive uniseriate wood rays.
8. Franchetella platyphylla (A. C. Smith) Aubr. (1) represents a transfer from Lucuma platyphylla A. C. Smith to Pouteria platyphylla (A. C. Smith) Baehni. The wood specimen is from the type tree, Krukoff 1316. A second specimen, Froes 166, appears to be more closely allied to F. gongrijpii; this specimen was received as Lucuma platyphylla.
9. Eremoluma purusiana (Baehni) Pires (unpublished?) was originally published as Pouteria purusiana Baehni (5), represented by the type specimen, Krukoff 5701, collected in Acre Territory, Brazil. To this the author has added Krukoff 5318, collected in the same general area. It is interesting to note that both of these specimens were cataloged in the FPL wood collection under the "as received" name Sarcaulus brasiliensis.
10. Franchetella reticulata (Engl.) Aubr. (1) appears to have a somewhat confused nomenclature that was discussed in detail by Eyma (6), who had referred it to Pouteria reticulata (Engl.) Eyma; this terminology was adopted by Baehni (4). Assuming that our single specimen, Forest Dep. (Guyana) 3466, is correctly identified, its affinity seems to be with E. sagotiana rather than F. tarapotensis as suggested by Eyma.
11. Eremoluma rostrata (Huber) Pires? is represented in this study by M. G. Silva 3773. This species was originally described as Lucuma rostrata Huber but later transferred to Pouteria rostrata (Huber) Baehni (4). It is very similar to E. jariensis, with which it shares intervessel pitting of 8-10  $\mu$ m.
12. Eremoluma sagotiana Baill. is the generic type of Eremoluma but we cannot be certain that our single wood specimen, Lanjouw & Lindeman 2651, is correctly determined.
13. Franchetella tarapotensis (Eichl.) Pierre is the generic type for Franchetella and was first described from the Peruvian Amazon. Our specimen received as this species, Froes 166 from Maranhao, Brazil, is removed a long distance from Peru and the exact identity may be questionable, although it certainly belongs in this series.



14. Franchetella unilocularis (Donn.-Sm.) Aubr. (2) is represented in this study by MEXUw 110 that was received as Sideroxylon meyeri Standl.; Aubréville cites this as a synonym. Our other specimen is Stevenson 4; its anatomy is practically identical to MEXUw 110.
15. Eremoluma virescens Pires? represented by N. T. Silva 2998 has inter-vessel pitting with a diameter of 6-8  $\mu$ m; its affinities would appear to be with jariensis and rostrata.
16. Eremoluma williamii Aubr. & Pellegr. (1) was described from Ferreira 5856 collected in the Manaus area of Brazil. A second specimen from the same area, Ferreira 5068, also belongs here. These two specimens are rather unique for this series of species in that the maximum pore diameter is approximately twice that of the other species, the wood rays are uniseriate, and the intervessel pitting is 8-10  $\mu$ m in diameter. Anatomically these specimens do not belong in Eremoluma, Franchetella, or Pouteria and while for the time being they are retained here, their proper "niche" remains to be determined.

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Table 1.--Selected measurements of specimens examined--Franchetella-Eremoluma

Species	Collector and number	Sp. gr.	Si	MPD	VML	FL	IV	R	MBH	Source
PORES IN DIFFUSE ARRANGEMENT										
		%		$\mu$ m	$\mu$ m	mm	$\mu$ m		$\mu$ m	
<u>F. anibifolia</u>	Krukoff 1447	0.91	1.47	95	520	1.08	4-5	2	355	Brazil
	Krukoff 4666	0.76	1.73	79	600	1.21	4-5	2	213	Brazil
	Krukoff 5009	0.76	0.72	87	550	1.10	4-5	2	236	Brazil
	Krukoff 5124	0.72	0.55	87	620	1.26	4-5	2	197	Brazil
	Krukoff 5595	0.77	1.98	79	610	1.27	4-5	2	252	Brazil
	Krukoff 6265	0.73	0.82	87	520	1.20	4-5	2	158	Brazil
	Krukoff 6568	0.81	0.93	95	630	1.26	4-5	2	236	Brazil
	Krukoff 6704	0.76	0.62	79	490	0.97	4-5	2	315	Brazil
<u>F. atabapoensis</u>	Wurdack & Adderley 42746	0.93	0.13	102	660	1.02	5-6	2	378	Venezuela
<u>E. campanulata</u>	Smith, A. C. 2944	0.86	2.85	95	760	1.26	4-6	2	102	Guyana
<u>E. jariensis</u>	Silva, N. T. 3370	0.90	0.75	102	670	1.29	8-10	2	355	Brazil
<u>E. krukoffii</u>	Krukoff 8619	0.82	1.34	134	790	1.47	4-6	1	000	Brazil
<u>E. purusiana</u>	Krukoff 5318	0.79	2.08	170	770	1.32	4-5	2	236	Brazil
	Krukoff 5701	0.73	1.84	110	730	1.21	4-5	2	213	Brazil
<u>E. rostrata</u>	Silva, M. G. 3773			110	560	1.08	8-10	3	197	Brazil
<u>E. virescens</u>	Silva, N. T. 2998	0.98	1.11	102	820	1.41	6-8	2	315	Brazil
<u>E. williamii</u>	Ferreira 5068			197	890	1.65	8-10	1	000	Brazil
	Ferreira 5856	1.45		220	770	1.64	8-10	1	000	Brazil

Table 1.--Selected measurements of specimens examined--Franchetella-Eremoluma--cont.

Species	Collector and number	Sp. gr.	Si	MPD	VML	FL	IV	R	MBH	Source
			%	$\mu$ m	$\mu$ m	mm	$\mu$ m		$\mu$ m	
PORES IN CLUSTERED-ECHELON ARRANGEMENT										
<u>F. crassifolia</u>	Prance et al. 14998	0.91	1.14	87	550	1.04	4-5	2	158	Brazil
<u>F. gongrijpii</u>	Lanjouw & Lindeman 2178	0.84	0.96	102	680	1.20	4-5	2	95	Surinam
	Schulz 7449	0.83	1.83	102	690	1.18	4-5	2	315	Surinam
	Stahel 233	0.87	0.33	110	760	1.27	4-5	2	79	Surinam
<u>F. platyphylla</u>	Krukoff 1316	0.84	2.22	110	630	1.24	4-5	2	394	Brazil
	Froes 166	0.90	0.89	102	700	1.21	4-5	2	394	Brazil
<u>F. reticulata</u>	For. Dep. 3466	0.89	0.67	110	910	1.66	4	1	000	Guyana
<u>E. sagotiana</u>	Lanjouw & Lindeman 2651	0.86	0.11	71	600	1.24	3-4	1	000	Surinam
<u>F. tarapotensis</u>	Froes 38	0.92	0.74	102	650	1.27	3	3-4	550	Brazil
<u>F. unilocularis</u>	MEXUw 110	0.95	1.16	79	520	1.21	3-4	4	315	Mexico
	Stevenson 4	0.96	2.74	79	560	1.14	3-4	2	315	Belize
UNASSIGNED SPECIMENS										
	Duarte 14218		0.35	87	530	1.14	4-6	4	276	Brazil
	Dugand 469	0.87	2.91	71	590	1.03	4-6	2	126	Colombia
	Dugand 577	0.96	3.10	63	420	0.94	4-6	4	291	Colombia
	Dugand 707	0.92	1.38	55	430	0.92	4-6	3	323	Colombia
	Dugand 1156	1.03	2.39	55	460	1.06	4-6	3	323	Colombia
	Froes 76	0.79	0.79	110	760	1.53	4	2	79	Brazil
	Froes 1069	0.87	0.58	95	740	1.34	3-4	3	450	Brazil
	Krukoff 8192	0.91	1.12	110	730	1.41	4-5	2	252	Brazil

Table 1.--Selected measurements of specimens examined--Franchetella-Eremoluma--cont.

Species	Collector and number	Sp. gr.	Si	MPD	VML	FL	IV	R	MBH	Source
			%	$\mu\text{m}$	$\mu\text{m}$	mm	$\mu\text{m}$		$\mu\text{m}$	
UNASSIGNED SPECIMENS--cont.										
Krukoff 8766		0.95	1.26	102	670	1.18	3-4	2	339	Brazil
Krukoff 8882		0.99	0.52	118	780	1.47	3-4	2	158	Brazil
Lisboa 1770		0.93	1.81	102	700	1.17	3-4	2	284	Brazil
Lisboa 1890		0.90	0.24	95	770	1.37	3-4	2	165	Brazil
Mad. Trop. 28		0.96	1.63	63	530	1.12	3-4	2	197	Mexico
Nascimento 323		0.80		79	670	1.20	3-4	2	197	Brazil
Nascimento 348				79	620	1.24	3-4	3	473	Brazil
Oliveira 2937		0.98	0.46	79	910	1.56	4-6	2	142	Brazil
Oliveira 3059		0.95	0.79	79	910	1.52	4-6	2	118	Brazil
Oliveira 4504			0.62	79	590	1.13	4-6	3	710	Brazil
Plowman & Rosa 9422		0.85	1.51	95	880	1.47	4-5	2	315	Brazil
Plowman & Rosa 9454		0.90	1.04	87	530	1.08	4-6	3	434	Brazil
Rosa, N. A. 238				95	430	0.91	3-4	4	394	Brazil
Rosa, N. A. 1836		0.95	0.59	118	660	1.32	4-5	2	394	Brazil
Rosa, N. A. 1845				118	700	1.24	3-4	3	804	Brazil
Rosa, N. A. 1849		1.00	0.33	118	960	1.73	6-8	2	331	Brazil
Stevenson 150		0.93	0.80	87	650	1.25	6-8	2	236	Belize

1/ Sp. gr. = specific gravity; Si = silica content; MPD = maximum tangential pore diameter; VML = vessel member length; FL = fiber length; IV = intervessel pit diameter; R = maximum ray seriation; MBH = maximum body height of multiseriate portion of wood rays. Silica analysis by Martin F. Wesolowski, Chemist, FPL.

Pores in clustered-echelon arrangement at 30 X.

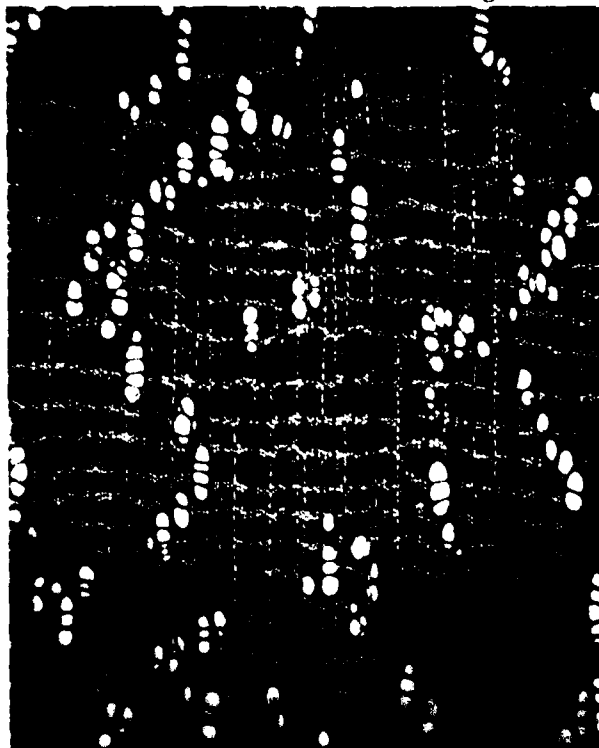


Figure 1.--Franchetella reticulata  
(Forest Dep. 3466).

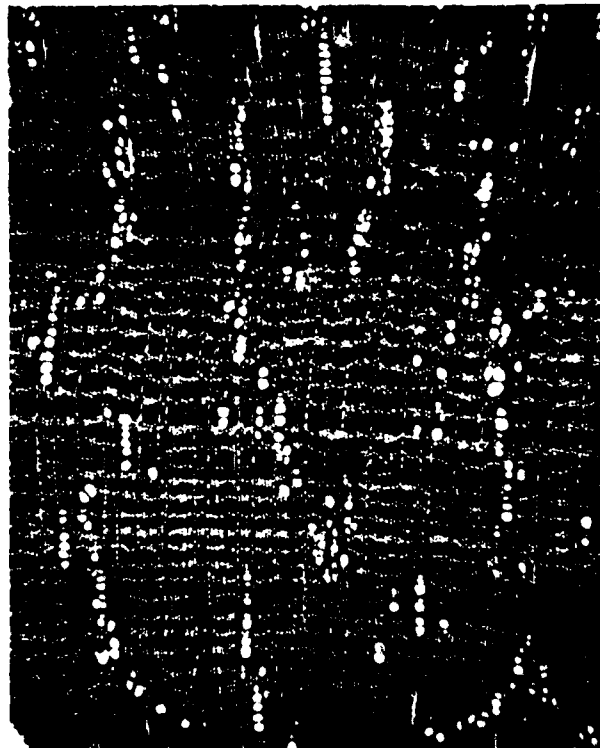


Figure 2.--Eremoluma sagotiana  
(Lanjouw & Lindeman 2651).

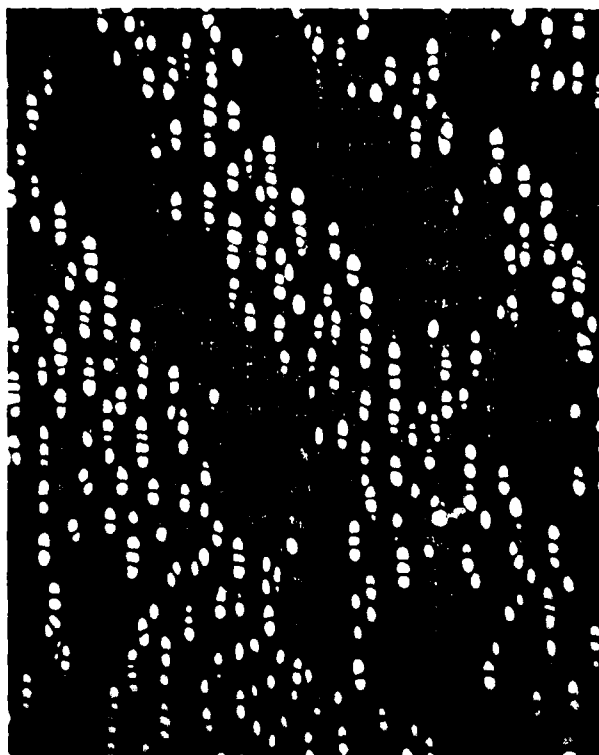


Figure 3.--Franchetella unilocularis  
(Stevenson 4).

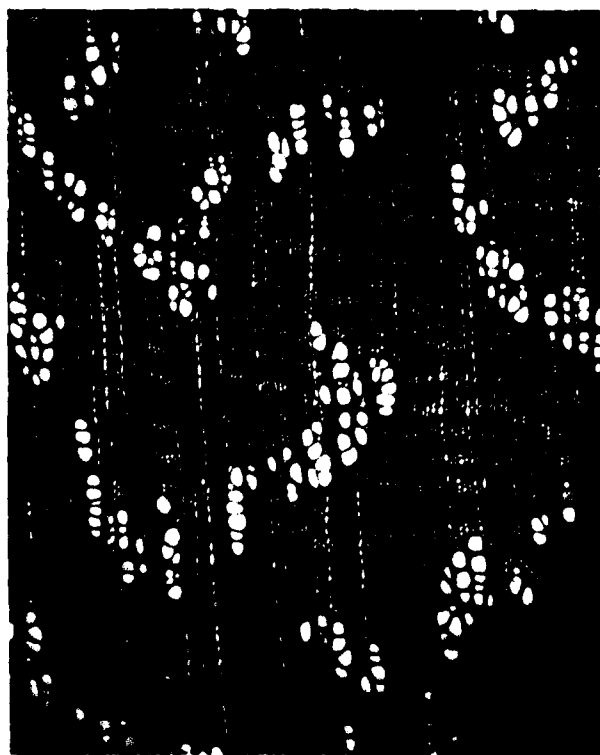


Figure 4.--Franchetella sp.  
(Froes 1069).

Pores in diffuse arrangement at 30 X.

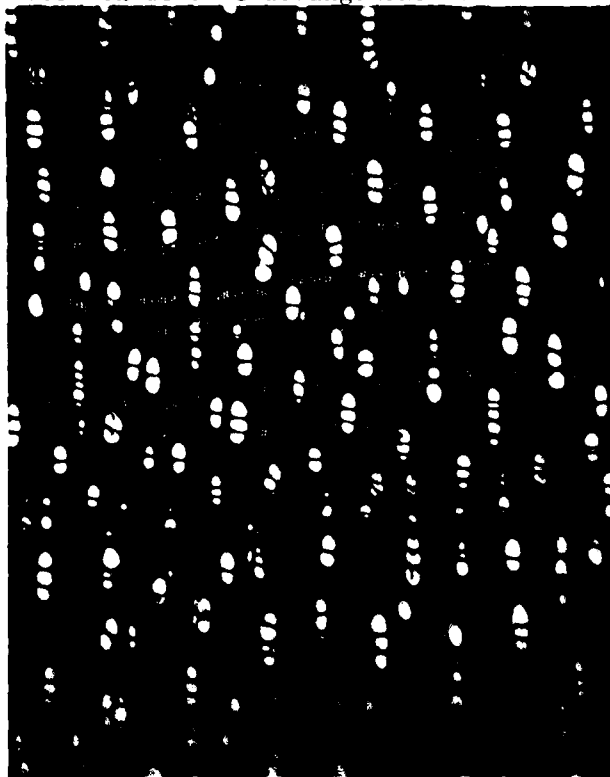


Figure 5.--Franchetella anibifolia  
(Krukoff 1447).

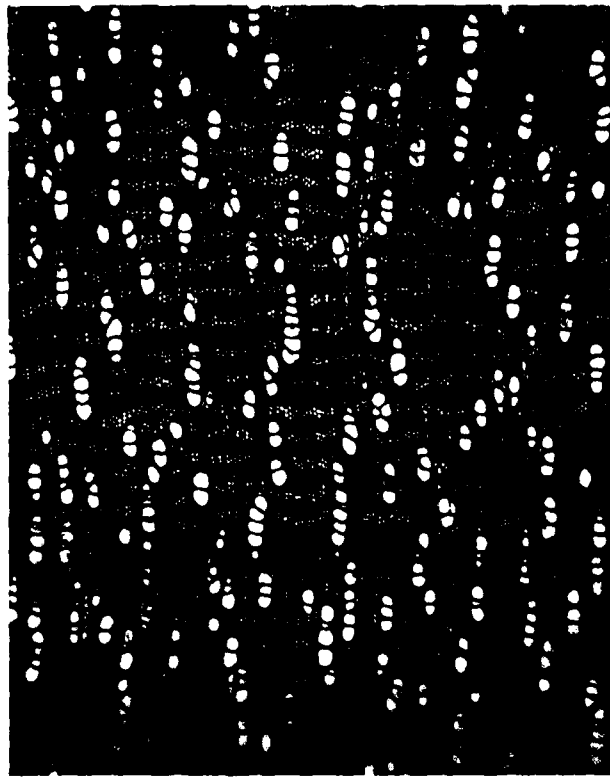


Figure 6.--Eremoluma campanulata  
(A. C. Smith 2944).

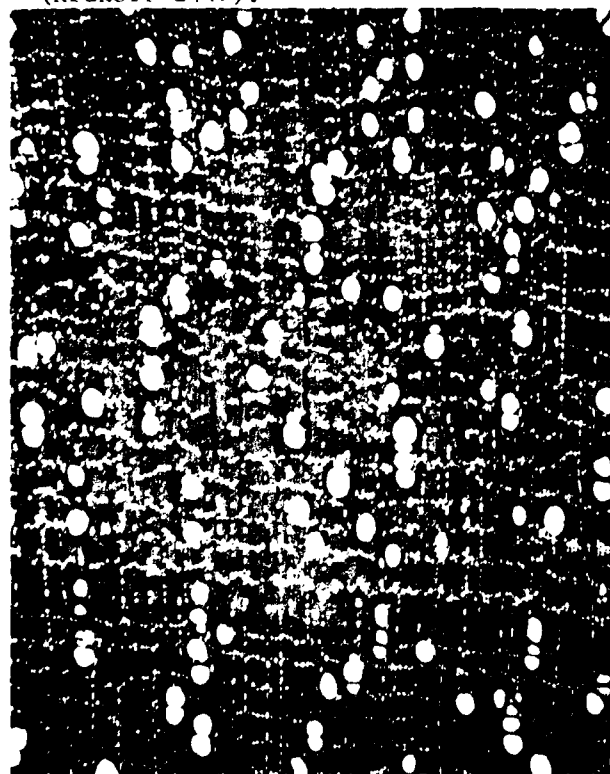


Figure 7.--Eremoluma krukoffii  
(Krukoff 8619).

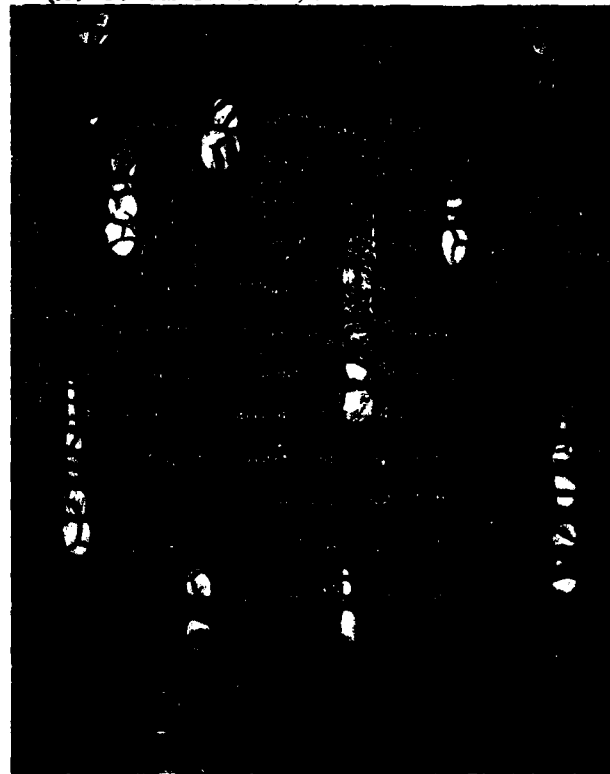


Figure 8.--Eremoluma williamii  
(Ferreira 5856).

U.S. Forest Products Laboratory

Wood anatomy of the neotropical Sapotaceae: XXXIV.  
Franchetella-Eremoluma, by B. F. Kukachka, FPL.

10 p. (USDA Fore Serv. Res. Pap. FPL 422).

Franchetella was described by Pierre in 1890 and the genus Eremoluma by Baillon in 1891. However, the species attributed to these two genera were soon absorbed into the large and ever-growing Lucuma. In 1942, when Baehni monographed the genus Pouteria, the type species of Franchetella and Eremoluma became synonyms of Pouteria in Section Eremoluma. In 1961 Aubréville reinstated Franchetella and Eremoluma to generic status but admitted they were closely allied; a similar opinion is held by J. M. Pires of Museu Goeldi.

Anatomically, two groups are evident but several species do not appear to belong to this series. Because of the confused taxonomy, which is also reflected in the wood anatomy, a detailed anatomical description has not been prepared at this time. It is hoped that the taxonomy will be clarified in the near future.

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